

**DEER MANAGEMENT PLAN**  
**FINAL INTERNAL SCOPING REPORT**

**INDIANA DUNES NATIONAL LAKESHORE**  
**NATIONAL PARK SERVICE**

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## PURPOSE OF AND NEED FOR ACTION

*As defined in the DO #12 Handbook, section 2.2:*

*Purpose is a broad statement of goals and objectives that NPS intends to fulfill by taking action... Objectives are a more specific statement of purpose, i.e., what must be accomplished in a large part for the action to be considered a success.*

*Need is a discussion of existing conditions that need to be changed, problems that need to be remedied, decisions that need to be made, and policies or mandates that need to be implemented.....Need is why action is being taken at this time.*

## INTRODUCTION

An internal scoping meeting was held to discuss management of white-tailed deer (*Odocoileus virginianus*) as part of a healthy and functioning ecosystem at Indiana Dunes National Lakeshore (national lakeshore). The goal of this meeting was to determine the purpose, need, and objectives for managing deer at the lakeshore, as well as to identify issues and concerns associated with current deer populations and their impact on the park ecosystem. Preliminary alternatives were also discussed.

White-tailed deer occur throughout the contiguous United States with the exception of portions of the Southwest (Coffey 1999). Prior to European settlement, North American white-tailed deer populations are estimated to have been between 23 and 24 million or about 8–11 deer per square mile (McCabe and McCabe 1984). These deer population numbers declined dramatically in the eastern U.S. after European arrival. In pre-statehood Indiana, white-tailed deer were found throughout the region, but were probably extirpated by 1900 (Mumford and Whitaker 1982). By 1884, reports from within the state indicated that deer were becoming quite rare.

White-tailed deer were reintroduced in Indiana in 1934 and by 1966 were present in all counties in the state. Populations have quickly increased due to a lack of natural predators and habitat alterations that have resulted in favorable conditions for deer across the U.S. The Indiana Department of Natural Resources now puts the statewide deer population at 300,000 animals with 100,000 taken annually by hunters. In the eastern United States, white-tailed deer populations have grown dramatically over the past four decades (Porter 1991). This growth has placed increasing demands on natural resources and open space in the region and often results in a negative impact on other natural resources such as vegetation and wildlife.

There has been comparatively little hunting in this area of national lakeshore since industrial and residential development occurred in the 20<sup>th</sup> Century. No hunting has been permitted since the park was established in 1966. Hunting does not occur in most eastern national park units, as it is usually not authorized by the enabling legislation. The three other national lakeshores around the Great Lakes do allow deer hunting in their enabling legislation. Since deer harvest has not been management policy for most national parks, deer populations have dramatically increased. In many parks, deer populations exceed densities of 40 deer/km<sup>2</sup> (100 deer/mi<sup>2</sup>) (Porter 1991).

Deer densities within sections of the east unit of the national lakeshore are estimated to be approximately 98 deer per square mile according to aerial infrared surveys. Numerous studies have demonstrated that deer densities this high can have unacceptable negative impacts on plant and animal species (Alverson 1988, Anderson 1994, Augustine and Frelich 1998, DeCalesta 1994, McShea 2000, McShea and Rappole 2000). These negative impacts would be inconsistent with the national lakeshore's preservation mandate.

Many entities, including federal, state, and local communities, have taken management actions regarding deer populations in order to protect valuable resources and promote safety and visitor experience. There are many instances of conflict between growing deer populations and resource management objectives (Porter 1992), including those objectives mandated by federal legislation under acts such as the Endangered Species Act, Clean Water Act, and the National Environmental Policy Act.

Existing planning documents for Indiana Dunes National Lakeshore do not address deer management issues; thus, no significant deer management actions have been implemented within the park. Deer management efforts have been undertaken by nearby Indiana Dunes State Park and the neighboring communities of Dune Acres and Beverly Shores. There is growing pressure from these entities to control the deer population within the national lakeshore. Without management, deer populations are expected to increase in the future due to continued lack of predators and favorable habitat conditions that are a result of human alterations to the landscape.

Specific park resources that are potentially at risk from overabundant deer populations include sensitive vegetation communities and wildlife. Indiana Dunes National Lakeshore has one of the highest numbers of vascular plant species in the National Park System. There are approximately 135 state-listed plants and one federally listed species found within the national lakeshore. Decline of the park's sensitive vegetation could potentially affect visitor satisfaction, as many visitors hope to see rare plant species when visiting park units. In addition, about 113 species of birds are considered regular nesters at the national lakeshore (Brock 1997) and many species, particularly ground and intermediate canopy nesters could potentially be affected by the impacts of deer on vegetation.

## **PURPOSE OF AND NEED FOR ACTION**

The purpose of this plan and environmental impact statement is to:

- identify and maintain a deer impact level that is in balance with other components of the ecosystem and other park values;
- facilitate public support, education, and appreciation for maintaining the integrity of that ecosystem;
- provide for a scientifically-based system of check and balances, such as monitoring, to ensure that deer populations are managed prior to degradation of park resources;
- determine how to manage deer populations once degradation appears imminent; and to
- identify and share with neighboring citizens and local governments the best technical information and expertise on deer management.

A deer management plan is needed to ensure that the local deer population does not become a dominant force within the lakeshore that negatively influences ecosystem components such as sensitive vegetation or other wildlife. Impacts to such significant park resources could

compromise the park's purpose to preserve the exceptional biodiversity found within its boundaries. Other resource management plans are in place within the park to protect resources such as sensitive plant species, but these plans do not provide direction regarding deer management.

The plan should also address the following:

- the relationship between deer population densities and the overall health of the local deer herd;
- the potential effect of deer populations on the restoration and augmentation of sensitive plant communities within the national lakeshore; and
- the effect of deer population on sensitive animal species within the national lakeshore.

## **SCOPE OF THE ANALYSIS**

The focus of the analysis is to develop deer management methods and strategies for Indiana Dunes National Lakeshore in cooperation with local, state, and regional entities as well as other federal agencies. A technical committee will be created to assist in well-defined components of the planning process such as: evaluating scientific literature and research on the topic of deer management; establishing a monitoring protocol for park deer populations and other park resources; and establishing resource thresholds at which deer management strategies would be implemented. Monitoring protocols and impact thresholds would be a component of all action alternatives evaluated in analysis. This would ensure that the deer population of Indiana Dunes National Lakeshore would be a balanced component of a functioning ecosystem within the park, not a dominant feature or driving force that causes impairment to other park resources and values.

Public understanding and support for any future efforts to maintain deer populations as a healthy component of the park ecosystem is extremely important. Because the issue of deer management is of great public controversy, an environmental impact statement is the most appropriate compliance pathway for this process.

## PARK PURPOSE AND SIGNIFICANCE

*NPS units were established by Congress to fulfill specified purposes, based upon the park's unique and "significant" resources. A park's purpose, as established by Congress is the fundamental building block for its decisions to conserve resources while providing for "enjoyment of future generations."*

*The following was explored with the park: why the unit was established as a park; what resources Congress recognized as needing NPS protection, and what purpose, mission, and objectives must be fulfilled by the park. After an impact analysis is completed on the alternatives, whether or not deer management actions fit into the purpose of the park, as defined by its enabling legislation will be revisited.*

*The park's Strategic Plan and General Management Plan summarize its authorizing legislation, its purpose and significance, as well as broad mission goals for the future. These statements were reviewed at the internal scoping meeting and are presented in this section.*

Indiana Dunes National Lakeshore was established by Congress as a unit of the National Park System on November 5, 1966, in order to "preserve for the educational, inspirational, and recreational use of the public certain portions of the Indiana Dunes and other areas of scenic, scientific, and historic interest and recreational value in the State of Indiana." The enabling legislation further states that the "lakeshore shall be permanently preserved in its present state, and no development or plan for the convenience of visitors shall be undertaken therein which would be incompatible with the preservation of the unique flora and fauna or the physiographic conditions now prevailing." Therefore, the purposes of the national lakeshore were designated as the following:

- Preserve, maintain, and restore the integrity and character of the natural resources and processes and protect cultural resource values at the lakeshore.
- Provide educational, inspirational, and recreational opportunities compatible with preserving natural and cultural resource values.
- Inspire in the public an appreciation of and a sense of personal stewardship for lakeshore resources.
- Interpret, encourage, and conduct scientific research in the tradition of pioneer investigators.

The following statements of significance explain why the national lakeshore is important to natural and cultural heritage.

- The national lakeshore contains exceptional biological diversity and outstanding floral richness, resulting from the combination of complex geological processes and the convergence of several major North American life zones.
- The national lakeshore's cultural resources represent the cultural evolution of northern Indiana from prehistoric times to the present day.

- The national lakeshore's extensive reach of undeveloped dunes provides recreational, educational, and inspirational opportunities within a one-hour drive of a major metropolitan area.
- The national lakeshore offers outstanding opportunities for scientific research due to the diversity and complexity of its natural systems, and provides a dynamic laboratory for early plant succession and faunal studies.
- The presence of heavy industry, long-standing transportation corridors, residential use areas, and natural areas at Indiana Dunes offers an outstanding opportunity to show visitors how these elements interrelate.
- The dunes provide a striking physical and emotional relief to the surrounding flat and highly developed landscape.

## BACKGROUND

### NPS ORGANIC ACT AND MANAGEMENT POLICIES

By enacting the National Park Service (NPS) Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of the Interior and the National Park Service to manage units “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 USC. § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the National Park Service must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 USC. § 1 a-1).

Despite these mandates, the Organic Act and its amendments afford the National Park Service latitude when making resource decisions that balance visitor recreation and resource preservation. By these acts Congress “empowered [the NPS] with the authority to determine what uses of park resources are proper and what proportion of the parks resources are available for each use” (*Bicycle Trails Council of Marin v. Babbitt*, 82 F.3d 1445, 1453 (9th Cir. 1996)).

Yet, courts consistently interpreted the Organic Act and its amendments to elevate resource conservation above visitor recreation. *Michigan United Conservation Clubs v. Lujan*, 949 F.2d 202, 206 (6th Cir. 1991) states, “Congress placed specific emphasis on conservation.” The *National Rifle Ass’n of America v. Potter*, 628 F.Supp. 903, 909 (D.D.C. 1986) states, “In the Organic Act Congress speaks of but a single purpose, namely, conservation.” The NPS *Management Policies* also recognizes that resource conservation takes precedence over visitor recreation. The policy dictates “when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant” (NPS *Management Policies* 2001, 1.4.3).

Because conservation remains predominant, the National Park Service seeks to avoid or to minimize adverse impacts on park resources and values. Yet, the National Park Service has discretion to allow negative impacts when necessary (NPS *Management Policies* 1.4.3). While some actions and activities cause impacts, the National Park Service cannot allow an adverse impact that constitutes resource impairment (NPS *Management Policies* 1.4.3). The Organic Act

prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts (16 USC 1 a-1). An action constitutes an impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values” (NPS *Management Policies* 1.4.4). To determine impairment, the National Park Service must evaluate “the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts” (NPS *Management Policies* 1.4.4).

Because park units vary based on their enabling legislation, natural resources, cultural resources, and missions, management activities appropriate for each unit and for areas within each unit vary as well. An action appropriate in one unit could impair resources in another unit. Thus, this environmental impact statement will analyze the context, duration, and intensity of impacts related to deer management within Indiana Dunes National Lakeshore, as well as potential for resource impairment, as required by *Director’s Order #12: Conservation Planning, Environmental Impact Analysis and Decision-making* (NPS 2001).

## **OTHER NPS POLICY AND LEGAL COMPLIANCE**

The National Park Service is governed by laws, regulations, and management plans before, during, and following any management action related to this environmental impact statement. These include the following:

### **National Environmental Policy Act, 1969, as Amended**

Section 102(2)(c) of this act requires that an environmental impact statement be prepared for proposed federal actions that may significantly affect the quality of the human environment or are major or controversial federal actions.

### **Endangered Species Act of 1973, as Amended**

This act requires all federal agencies to consult with the Secretary of the Interior on all projects and proposals having potential impact on federally endangered and threatened plants and animals.

### **The Organic act of 1916, as Amended**

By enacting the NPS Organic Act of 1916 (Organic Act), Congress directed the U.S. Department of the Interior and the National Park Service to manage units “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 USC. § 1). The act gives the Secretary of the Interior discretion to provide “for the destruction of such animal and of such plant life as may be detrimental to the use of any of said parks, monuments, or reservations.”

### **The National Historic Preservation Act of 1966, as Amended**

Section 106 of this act requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register of Historic Places. All actions affecting the parks’ cultural resources must comply with this legislation.

### **The Historic Sites Act of 1935**

This act declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance. It gives the Secretary of the Interior broad powers to protect these properties, including the Secretary's authority to establish and acquire nationally significant historic sites.

### **Code of Federal Regulations, 1992**

Title 36, Chapter 1 provides the regulations "for the proper use, management, government, and protection of persons, property, and natural and cultural resources within areas under the jurisdiction of the National Park Service." It states that "the National Park Service has the authority to manage the wildlife in the parks in fulfillment of the Organic Act without the consent of the state and by methods contrary to state law" (16 U.S.C.3). Permits from the Indiana Department of Natural Resources are not required for the National Park Service to manage the deer in their parks.

### **The Redwood National Park Act of 1978, as Amended**

All National Park System units are to be managed and protected as parks, whether established as a recreation area, historic site, or any other designation. This act states that the National Park Service must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

### **Management Policies, U.S. Department of the Interior, National Park Service, 2001**

This is the service-wide policy document of the National Park Service. It states the conditions or processes that must be undertaken, considered, or followed before taking a management action. *NPS Management Policies* provides the general direction and foundation for management actions of the National Park Service.

### **Natural Resources Management Guideline, NPS-77, 1991**

The purpose of this document is to provide guidance to park managers for all planned and ongoing natural resource management activities. Managers must follow all federal laws, regulations, and policies. This document provides the guidance for park management to design, implement and evaluate a comprehensive natural resource management program.

### **Executive Order 13007 - Indian Sacred Sites**

This executive order requires the National Park Service to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

### **Executive Order 11988 - Floodplain management**

This executive order directs the National Park Service to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

**Executive Order 11990 - Protection of Wetlands**

This executive order directs the National Park Service to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

**Executive Order 12898 - Environmental Justice in Minority Populations and Low-Income Populations**

The National Park Service must address, as appropriate, disproportionately high and adverse human health or environmental effect of its programs, policies, and activities, including planning projects, on minority populations and low-income populations.

**Indiana Dunes National Lakeshore Enabling Legislation (Public Law 89-761, November 5, 1966, 80 Stat 1309)**

This law establishes general park authorities and purpose as mentioned above under “Park Purpose and Significance.”

**Statement for Management, Indiana Dunes National Lakeshore 1993**

This document contains information about the park’s purpose and significance, influences on park resources, major issues, and management objectives of the park. Abundant deer populations are mentioned as a potential threat to stability of the natural ecosystem in this document.

**Indiana Dunes National Lakeshore General Management Plan 1997**

The 1997 *General Management Plan* combines the National Park Service’s 1992 *West Unit General Management Plan Amendment*, the 1991 *Little Calumet River Corridor Plan*, and the 1997 *East Unit General Management Plan Amendment*. It defines the management philosophy and goals for the national lakeshore decision making and problem solving for 20 years following the plan.

**Indiana Dunes National Lakeshore Strategic Plan 1997**

The plan identifies mission goals representing the future (20+ years) for the national lakeshore. This includes formulation of long term goals under each mission goal and estimation of costs associated with implementation of the strategic plan.

**SUMMARY OF DEER MANAGEMENT ISSUES IN PARKS**

Within eastern national parks such as Indiana Dunes National Lakeshore, landscapes have been managed to allow for preservation and rehabilitation of scenic, scientific, and historic lands. The result is a mixture of forest, shrub, and grassland, which constitute excellent habitat for white-tailed deer. Since deer harvest has not been part of management policies in the majority of parks, the population of deer has greatly increased. Today in many areas, the density of deer exceeds 40 deer/km<sup>2</sup> (100 deer/mi<sup>2</sup>) (Porter 1991), and it has been established that deer densities this high can have negative impacts on plant and animal species (Alverson 1988, Anderson 1994, Augustine and Frelich 1998, DeCalesta 1994, McShea 2000, McShea and Rappole 2000).

Other national park units have been involved in deer management planning efforts and have served as examples of the high public emotion and controversy that surrounds the subject. Gettysburg National Military Park and Eisenhower National Historic Site completed an environmental impact statement and white-tailed deer management plan in 1995 and are currently implementing management strategies. Deer management planning efforts are also being undertaken at Catoctin Mountain Park and Cuyahoga Valley National Recreation Area. Fire Island National Seashore is researching immunocontraception as a means of population control for deer.

As mentioned above, overabundant deer populations have been shown to cause negative impacts to natural resources such as vegetation and wildlife. In addition, a high level of deer activity may conflict with a park's ability to maintain historically accurate cultural landscapes. The principal challenge for park managers is to determine what levels of deer populations and resulting resource impacts are acceptable within the park or particular park management zones. More specific issues related to deer management are discussed below.

### **Vegetation Impacts**

Intense deer browsing on vegetation is a concern for park managers. Impacts include loss of plant species that may cause change to the diversity and structure of plant communities and potential impacts to dependent wildlife. Biological diversity in eastern forests has declined as deer seek out and consume highly preferred plant species. A plant species known as the large-flowered trillium (*Trillium grandiflorum*) is common to the Great Lakes region and is favored by deer. Anderson (1994) recommended a density of 4-6 deer/km<sup>2</sup> (10-16 deer/mile<sup>2</sup>) to maintain large-flowered trillium stem heights and flowering plants in deciduous forests in northeastern Illinois. High deer densities can skew *Trillium* spp. population toward small plants and can lead to extirpation of sensitive forbs such as *Trillium* spp. (Augustine and Frelich 1998). A density of 8 deer/km<sup>2</sup> (21 deer/mile<sup>2</sup>) appears far too high for maintaining the diversity of all plants and animal species in northern hardwood forests. Densities as low as 4 deer/km<sup>2</sup> (10 deer/mile<sup>2</sup>) may prevent woody species such as white cedar (*Thuja occidentalis*) and some herbaceous species regeneration in northern Wisconsin (Alverson 1988). If deer browsing activities are not controlled, the impacts from the deer increase to develop a "browse line." At this particular stage, feeding by deer is much less selective. The effect extends 1.5 to 2 meters from the ground up. All herbaceous species and most shrub species are eliminated.

### **Wildlife Impacts**

Over browsing by deer greatly reduces the biological diversity of plant communities resulting in low diversity forest ecosystems. Animal species that are dependent upon these plant communities for habitat are also affected. A further threat to low diversity forests is the reduced ability to resist attacks from insects, diseases, or other stresses. Deer have become a major force in determining the structure of the natural community in some forest ecosystems.

Deer browsing has been shown to lead to a decline in nesting bird species richness by 27% and abundance by 37% (DeCalesta 1994) between low and high densities of deer. Increasing understory density and diversity by reducing deer density (McShea and Rappole 2000) can reverse the changes in bird communities and benefit migrant bird species. In oak hickory forest deer feeding on acorns can depress eastern chipmunk (*Tamias striatus*) and white-footed mouse (*Peromyscus leucopus*) population numbers during low acorn mast years (McShea 2000).

## Health and Safety Concerns

Overabundant deer populations in parks can create problems regarding visitor health and safety. In areas where deer become accustomed to people, some visitors perceive them as tame animals and may become injured when they come in close contact with deer. Deer can carry deer ticks (*Ixodes scapularis*), which are known to carry the spirochete *Borrelia burgdorferi* the cause of Lyme disease in humans and pets. Additionally, the potential for collisions of vehicles with deer on roads within and around the park is of concern (Coffey 1999).

## Regional Deer Management History

Local communities and other entities surrounding the Indiana Dunes National Lakeshore have taken action regarding white-tailed deer management within their boundaries. The community of Dune Acres was the first to implement a deer management program in the area, followed by the Indiana Dunes State Park and the community of Beverly Shores. Data regarding the numbers of deer taken each year are shown below.

**Regional White-Tailed Deer Cull Numbers for Entities Surrounding Indiana Dunes National Lakeshore**

White-Tailed Deer Cull Numbers						
Year	Dune Acres		State Park		Beverly Shores	
	Number of Deer	Number of Deer/mi <sup>2</sup>	Number of Deer	Number of Deer/mi <sup>2</sup>	Number of Deer	Number of Deer/mi <sup>2</sup>
1997-1998	50	83.3	0	0.0	0	0
1998-1999	0	0.0	201	59.0	0	0
1999-2000	19	31.7	117	34.3	0	0
2000-2001	<10*	16.6	102	29.9	1	1
2001-2002	25	41.7	53	15.5	70~	70
<b>Total</b>	<b>104</b>		<b>473</b>		<b>71</b>	

\* Cull permit was for 10 deer

~ Estimate - exact number not known

- Dune Acres implemented deer management controls using sharpshooters to decrease numbers. This program has been in place for 5 years with 50 deer taken the first year, and 0 – 25 deer taken in following years.
- Indiana Dunes State Park opened to special hunts for two two-day sessions over the past four years. Over that time period, 470 deer have been harvested from the park. There are currently no plans for a hunt for the 2002/2003 season.
- Beverly Shores began bow hunting by resident invitation in the 2001/2002 season and continued the program in the 2002/2003 season. Prior to the decision to implement hunting, the community explored the option of contraceptive management. However, the conditions of the permit issued by the Indiana Department of Natural Resources proved to be too restrictive to implement the program.

For monitoring purposes Indiana Dunes National Lakeshore has established three 20-meter square exclosures in several areas throughout the park. These are located near Howes Prairie, within the Heron Rookery, and west of Beverly Shores. In the Cowles Bog area, an exclosure approximately 2 acres in size protects a rare white cedar population in addition to other sensitive

plant species. In addition, one-meter square exclosures have been established at select known populations of rare vegetation that tend to be desirable to deer. These experimental plots yield secondary benefits to the rare plant species by affording them protection. Other deer monitoring actions at the national lakeshore include annual spotlight and several aerial infrared surveys of deer populations within the park and adjacent communities. This is the extent of active management action related to deer in the park.

A Dunes Region Deer Study Committee was formed in February of 1999 to “develop recommendations for the Indiana Department of Natural Resources, other land holding agencies, and communities for managing deer along the Lake Michigan Shoreline.” Specific areas of concern included Indiana Dunes State Park, Indiana Dunes National Lakeshore, and the communities of Dune Acres and Beverly Shores. The process consisted of nine meetings and two field trips. A final report was released in August of 1999 detailing the consensus management recommendations of the committee. The report is included as Appendix A of this internal scoping report. (Note: The recommendations were not unanimous. The committee did not take votes but operated on reaching consensus).

## **ISSUES AND IMPACT TOPICS**

Issues associated with white-tailed deer management at Indiana Dunes National Lakeshore were identified by park staff during the internal scoping meetings at the park and discussed below.

### **WILDLIFE AND WILDLIFE HABITAT**

#### **Impact topic (WW1): Impact of Deer Populations on Wildlife and Habitat**

Issue: At certain levels, deer populations will have adverse effects on other wildlife and/or habitat by impacting habitat through browsing activities.

Results of Discussion with Park: Indiana Dunes National Lakeshore has a number of bird species that depend on lower canopy or ground level nesting habitat. Deer browsing has been shown to cause a reduction in abundance and diversity of these species (DeCalesta 1994). Deer can also have an impact on small mammal populations through competition for food such as acorns (McShea 2000).

#### **Impact topic (WW2): Impact to Threatened and Endangered Species**

Issue: Habitat for threatened or endangered wildlife may be vulnerable to impact from high levels of deer browsing activity.

Results of Discussion with Park: The Karner blue butterfly (Kbb) (*Lycaeides melissa samuelis*) could be negatively impacted by heavy deer browsing activity on wild lupine (*Lupinus perennis*). In one area deer consumed 90 percent of lupine plants (Packer 1994). Wild lupine is the sole food source for larvae Kbb. If lupine abundance decreases so will the Kbb. Deer can also be an incidental predator on Kbb larvae (Schweitzer 1994).

#### **Impact topic (WW3): Impact of Disease on Wildlife Species and Deer Health**

Issue: Disease that deer are susceptible to could negatively impact other national lakeshore wildlife species or the health of the deer population.

Results of Discussion with Park: An example is chronic wasting disease, which may require quick implementation of management actions and cooperation with the Indiana Department of Natural Resources and the Centers for Disease Control and Protection (CDC) to protect the deer population.

## **VEGETATION**

### **Impact topic (V1): Impact to Vegetation Resources**

Issue: At certain population levels, deer browsing and activity patterns may adversely affect native plant communities, including populations of sensitive plant species.

Results of Discussion with Park: The national lakeshore contains approximately 135 species of rare or sensitive plant species (state listed) and one federally listed species. Plant species favored by deer could be adversely impacted by intense deer browsing activity. In addition, the overall structure of plant communities could be affected by the creation of browse lines or the unbalanced affinity of deer towards certain species. Some forest understory species are at risk for extirpation from the national lakeshore. *Trillium* spp. are an example, because they are a preferred food of deer and occur in isolated patches.

### **Impact topic (V2): Impact to Wetlands**

Issue: Deer could possibly have negative and positive effects on vegetation in wetland areas through high levels of browsing.

Results of Discussion with Park: The national lakeshore contains some cattail marsh areas that were historically sedge meadow areas. Deer activity in these areas is considered to be beneficial since paths that deer keep open in these areas allow other plant species to survive. Conversely, deer feeding in wetland areas may have a negative impact on some rare wetland plant species and hinder restoration efforts.

### **Impact topic (V3): Impact to Exotic Vegetation**

Issue: Deer activity may increase populations of exotic plants by creating desirable conditions through disturbance and transporting seeds to uninfested areas.

Results of Discussion with Park: Some areas within the national lakeshore could have issues with potential spread of exotics by deer activity, which will hinder the containment of exotics.

## **VISITOR CONFLICTS AND SAFETY**

### **Impact topic (VC1): Impact to Visitor Safety**

Issue: Deer can cause accidents with vehicles on roadways, particularly as deer populations increase. Deer, which have been feed by residents of near by communities, can pose a threat to visitors, because these animals will approach people for food.

Results of Discussion with Park: The national lakeshore receives complaints from members of surrounding communities regarding collisions with deer and damage to vehicles. The Indiana Department of Transportation has documented annual deer vehicle accident rates as high as 823 (in 1994) for Lake, Porter, and LaPorte counties combined. Visitors enjoy seeing wildlife and

will offer food to animals that have learned to beg. Semi-tame deer pose a threat to visitors who do not understand the danger and try to feed the deer.

### **Impact topic (VC2): Impact to Visitor Health**

Issue: Deer related diseases may pose health risks to park visitors or area residents.

Results of Discussion with Park: Deer ticks carry Lyme disease and the CDC has stated that abundant deer and rodent hosts are necessary to maintain the enzootic cycle for the spirochete *Borrelia burgdorferi*. Chronic wasting disease may eventually become an issue in the national lakeshore area.

## **VISITOR EXPERIENCE**

### **Impact topic (VE1): Impact of Deer Management on Visitor Experience Goals**

Issue: If deer management activities were to decrease the numbers of deer in the park, chance sightings by visitors would also decrease.

Results of Discussion with Park: Some visitors to the park may view deer sightings as an integral part of their visit. Deer management actions may decrease the potential for visitors to observe deer within the national lakeshore, causing less visitor satisfaction.

### **Impact topic (VE2): Conflict with State and Local Ordinances and Policies Regarding Deer Management**

Issue: Some states and local governments have taken action, or are considering taking action to manage deer populations within their jurisdictions. While the park may not be a part of these local actions, consistency with state and local plans must be evaluated.

Results of Discussion with Park: The communities of Dune Acres and Beverly Shores, along with Indiana Dunes State Park, have taken action to manage deer populations within their boundaries. Due to the close proximity of the park, management actions undertaken at the national lakeshore may benefit surrounding entities that have taken management actions.

## **CULTURAL RESOURCES (SECTION 106)**

### **Impact topic (CR1): Impact to Cultural Resources**

Issue: In some cases, the presence and activities of deer may affect the historical accuracy of a given site by creating conditions that differ from the historical situation.

Results of Discussion with Park: Deer may affect the ability of the park to maintain historically accurate cultural landscapes such as the Chellberg Farm and Bailly Homestead near park headquarters. The garden and cornfield at this location are important historical components that have been significantly damaged by deer and raccoon feeding. The farm dates to the early 1900s when deer populations were extremely low, if not already extirpated, which dramatically conflicts with the current situation.

## **ENVIRONMENTAL JUSTICE**

### **Impact topic (EJ1): Impact of Deer Management on Local Minority or Low-Income Populations**

Issue: The potential exists for impacts to low-income or minority populations from deer populations or deer management activities.

Results of Discussion with Park: There are potential beneficial effects to low-income families from donation of meat if a management plan was implemented that contained lethal action.

## **SOCIOECONOMIC EFFECTS**

### **Impact topic (SE1): Impact of Deer Management on Local Economy**

Issue: Deer management activities could either benefit or adversely impact tourism and the local economy depending upon the deer management strategy implemented.

Results of Discussion with Park: Some businesses that profit from tourism or monies spent on hunting would potentially experience beneficial effects if hunting was implemented within the park. Conversely, if deer management activities result in lower deer numbers, this may influence the desire of visitors to visit the park and may decrease area tourism revenues. It is also possible that visitors who come to the national lakeshore to watch birds or search for rare plants may stop coming as deer numbers increase and rare plants and birds are negatively affected.

## **SOUNDSCAPES**

### **Impact topic (SS1): Impact of Deer Management Strategies on Park Soundscapes**

Issue: Certain deer management strategies may cause disturbance to soundscapes.

Results of Discussion with Park: There is a potential for noise disturbance if management methods utilizing firearms are implemented.

## **WATER QUALITY**

### **Impact topic (WQ1): Impact to Water Quality from Deer Populations**

Issue: Deer fecal matter could potentially contaminate surface water supplies.

Results of Discussion with Park: This is a potential issue that should be explored further.

## **ISSUES ELIMINATED FROM FURTHER CONSIDERATION**

These issues were reviewed and subsequently eliminated from further discussion because potential deer management strategies would not cause changes to these resources.

- Air quality
- Floodplains

## **OBJECTIVES IN TAKING ACTION**

Objectives are “what must be achieved to a large degree for the action to be considered a success” (Director’s Order #12). All alternatives selected for detailed analysis must meet all objectives to a large degree, and resolve purpose and need for action. Objectives for managing deer populations must be grounded in the park’s enabling legislation, purpose, significance, and mission goals and be compatible with direction and guidance provided by the general management plan.

The following are the objectives related to deer management derived with park staff at the internalscoping meetings.

## **MANAGEMENT METHODOLOGY**

- Determine a science-based well-informed, public-supported, and defensible vegetation and wildlife impact level and corresponding density of deer populations that would serve as a threshold for taking management action within the national lakeshore.
- Develop and implement an adaptive management approach (Porter and Underwood 1999) for maintaining a healthy deer population within Indiana Dunes National Lakeshore.

## **WILDLIFE AND WILDLIFE HABITAT**

- Maintain a healthy white-tailed deer population within the national lakeshore while protecting other park resources.
- Protect lower canopy and ground nesting bird habitat from adverse impacts from deer browsing.
- Protect habitat of threatened and endangered species from adverse impacts related to deer browsing.

## **VEGETATION**

- Prevent deer browsing impacts from impairing the park’s ability to achieve vegetation management objectives and goals.
- Protect enhanced or restored sensitive plant populations within the park from deer browsing.
- Do not allow deer browsing impacts to lead to the extirpation of rare plant species.

## **VISITOR CONFLICT AND SAFETY**

- Reduce the potential for deer and visitor safety conflicts, including vehicle collisions.

## **VISITOR EXPERIENCE**

- Educate the public regarding deer population and ecosystem issues, including the role of deer as part of a functioning park ecosystem, not the driving force within it.

## **CULTURAL RESOURCES**

- Recreate and manage historically accurate cultural landscapes. This includes maintaining the deer impact and visibility to an acceptable level to achieve the desired historical landscape.

## **RELATIONSHIP TO OTHER PLANS, POLICIES, AND ACTIONS**

Prior park planning efforts have not specifically addressed deer management issues, but call for the protection of park resources and values. These planning efforts include the Indiana Dunes National Lakeshore 1997 *General Management Plan/Final EA* and the *Indiana Dunes National Lakeshore 1997 Strategic Plan*.

As mentioned in the Regional Deer Management History section, surrounding entities have implemented deer management controls through cull efforts. Efforts have taken place at Indiana Dunes State Park, as well as the communities of Dune Acres and Beverly Shores. Future implementation of these control efforts have the potential to affect deer management efforts undertaken by the national lakeshore.

The Northwestern Indiana Regional Planning Commission is currently working on a 2030 Plan for development in the area (Personal Communication, Regie Corthal NIRPC and EDAW February 3, 2003).

Future transportation projects could potentially have impacts on park resources either directly through construction activity, or indirectly through changing traffic patterns. The Interstate 80/94 corridor is the highest traveled truck route in Indiana, and air quality impacts from transportation in the area may affect park resources. In addition, several state and county roadways are located in the vicinity of the park. The Indiana Department of Transportation publications website lists ongoing and future road projects in the 2000-2025 Long Range Plan. The following transportation projects are among those listed for the LaPorte District that could potentially have effects on park resources.

- Additional travel lanes to State Road 149 from Lenburg Road to US 20 in Burns Harbor.
- New Road Construction of US421 from Interstate 80/90 (toll Road) to Interstate 94.
- Additional travel lanes to State Road 49 from Interstate 94 to Oak Hill Road in Chesterton.
- Additional travel lanes to US Highway 6 - 0.4 miles east of SR 51 to Scottsdale Road, 2.4 miles west of SR 149.

## ALTERNATIVES

See DO-12, 2.7; 4.5 (EIS); 5.3 (EA)

*These are preliminary alternatives, but at a minimum, they must meet objectives to a large degree while resolving purpose and need for action.*

All alternatives must be consistent with the purpose and significance of Indiana Dunes National Lakeshore, and must meet the purpose of and need for action, as well as the management objectives. The following preliminary alternatives were formulated to meet the management objectives identified during the scoping process. The action alternatives address different methods to manage deer populations in order to achieve specific management objectives. The alternatives could be used individually or in some combination that would be appropriate for achieving the management objectives.

### ACTIONS COMMON TO ALL ACTION ALTERNATIVES

The following actions would be common to all alternatives.

- Scientific monitoring and modeling methods would be used to determine when population levels reach a threshold where management action is necessary. This would entail continuation and expansion of monitoring for both vegetation impacts and deer population in order to correlate impact levels with deer population numbers.
- Education and interpretive measures would be implemented and could involve various efforts including:
  - Exhibits at visitor centers on deer management
  - Expansion of website to include information on deer management
  - Brochures/ publications
  - Teacher workshops
  - Assistance of other organizations
  - Education regarding the negative effects of feeding.

### NO-ACTION ALTERNATIVE

Under the no action alternative, no management actions would be undertaken to manage deer populations within Indiana Dunes National Lakeshore. Current monitoring efforts would continue to record impacts and deer population numbers within the park unit. Education and interpretive measures could be used to inform the public about deer ecology and park resource issues, but no active deer management would take place.

## **ALTERNATIVE A – FENCING AND REPELLENTS**

Under Alternative A, fences would be installed to keep deer away from sensitive national lakeshore resources. Due to accessibility, feasibility, and cost issues, a fence would not be installed around the entire boundary of the national lakeshore. Rather, smaller areas of known sensitive resources such as rare plant populations or important cultural resources would be fenced to protect them from deer browsing.

In areas where installation of a fence is undesirable, such as around historical resources where visibility of a fence disrupts the historical integrity of the site or in areas with scenic viewsheds, repellents would be used. Repellent products available for use in deer management include application products such as Ro-pel, Hinder, and soap, or sonic repellent devices. The application substances use odors or bad tasting coatings to deter deer from visiting areas or browsing on certain vegetation.

Repellants would only be used in specific areas, as use over the entire park area is not feasible due to cost and the disruption to visitors from noise or spraying activities. Repeated applications of spray repellents would be necessary due to weather and emergence of new growth. The effectiveness of repellents is debatable; thus, they would be implemented on an experimental basis until the level of effectiveness is established.

## **ALTERNATIVE B – REPRODUCTIVE CONTROL**

Under Alternative B, female deer would be sterilized or contraceptives would be administered to control deer reproduction within the park. Results would not be immediate, as it would take some time for population reductions to take place due to decreased reproduction rates. Fertility experts in the field of deer contraception believe isolated populations have the best chance for successful reduction of herd numbers (Maryland Department of Natural Resources n.d.) and contraception is problematic in a free roaming deer herd. A fertility control plan could be implemented initially as a study on a small scale to determine the effectiveness of the program at the national lakeshore.

Contraception can be used to control deer populations under some circumstances (Porter and Underwood 2001). The most promising approach is using porcine zona pellucida (PZP) delivered by remote injection. PZP is still an experimental drug and requires approval of the United States Food and Drug Administration through the Humane Society of the United States. Also, all deer treated with PZP must be individually identified (Rudolph et al. 2000), which is often accomplished using ear tags. Capturing and handling each deer is necessary to meet the identification requirement, which can make this alternative expensive and time consuming. Immunocontraception is best suited to localized populations where the number of breeding females to be treated is small (less than 200 deer) and managers are trying to maintain the deer population between 30% and 70% of carrying capacity (Rudolph et al. 2000).

## **ALTERNATIVE C – DIRECT REDUCTION**

Under Alternative C, NPS personnel or authorized agents of the park would shoot deer to reduce the population. Only people that are highly skilled and trained in the use of firearms and public safety would participate in the reduction. Bait stations may be used to attract deer. High-velocity rifles would be used from close range. Every effort would be made to make the shootings as humane as possible. Where a bullet injures a deer, the animal would be shot again as quickly as

possible to minimize suffering. Silencers and night vision equipment may be employed to reduce disturbance to the public. Compliance with all federal firearm laws administered by the Bureau of Alcohol, Tobacco, and Firearms would be required.

The action would occur during fall and winter months when deer are more visible in the park to reduce the amount of time required to complete the action. The public would be notified of the days, times, and methods of the management action well in advance of the activities. In addition, exhibits would be displayed at visitor centers, and information would be posted on the park's website to educate the public regarding deer management actions. Visitor access would be restricted as necessary during the time the reduction is taking place and the park would be patrolled by NPS law enforcement to ensure safety of the public. Since shooting would occur during the winter months, visitation levels would be low.

Safety zones would be established around buildings and participants would be required to wear fluorescent orange as a safety measure. Bait stations would be established away from public use areas to concentrate the deer into specific areas and to maximize the efficiency of the reduction action. This would reduce the number of necessary participants and shooting time.

Crews would collect, field-dress, and process the deer at established check stations and record data such as age and sex. Waste, such as removed hides and entrails, would be used or disposed of consistent with federal and state laws and regulations. Venison would be donated to local charity organizations. Refrigerated storage would be used if air temperatures are above 50 degrees at the time of the shootings.

## ALTERNATIVE D – PUBLIC HUNTING

Under Alternative D, public hunting or a controlled public hunt would be allowed within the national lakeshore on designated days in order to reduce deer numbers. This action would require a change to the park's enabling legislation as hunting is currently prohibited at Indiana Dunes National Lakeshore. According to *NPS Management Policies (2001)*, hunting is allowed in park units when specifically authorized by statute or regulation and not subsequently prohibited by regulation (Section 4.4.3). Hunting would be regulated and would occur only in designated areas that are carefully chosen based on safety issues. Only licensed hunters that meet Indiana state hunting regulations and have taken a hunting safety class would be eligible to participate. A predetermined number of hunters could be selected by lottery from Indiana licensed deer hunters to participate in a controlled hunt.

The action would occur during fall and winter months when deer are more visible in the park to reduce the amount of time required to complete the action. The public would be notified of the days, times, and methods of the management action. In addition, exhibits would be displayed at visitor centers, and information would be posted on the park's website containing educational material regarding deer management actions, including controlled hunting. Visitor access would be restricted in the specific area during the time the hunting is taking place and the park would be patrolled by NPS law enforcement to ensure safety of the public. Since hunting would occur during the winter months, visitation levels would be low.

The taking of antlerless deer would be mandated for more efficient reduction of herd numbers over the long term. Buck-only hunting will not control population growth, as deer populations are largely dependent on the number of does with potential for reproduction. Harvest of

antlerless deer is necessary to stabilize or reduce populations (W. Virginia University 1985). The West Virginia University Agricultural Extension Service recommends that for a rapid decrease in deer population, 15 antlerless deer should be taken for every 10 antlered bucks. For a slower decrease, the ratio is 12:10 antlerless to antlered individuals.

Hunting outside the park would also be encouraged to make population control efforts more effective.

## **ALTERNATIVE E – COMBINED MANAGEMENT**

Under Alternative E a combination of Alternative A - Fencing and Repellents, Alternative B - Reproductive Control, and Alternative C - Direct Reduction, would be used to manage deer. Fencing would be used to protect small populations of sensitive plant species and small plant restoration projects. A small section of the national lakeshore would be selected for a reproductive control study to test the applicability of the method to manage deer at the national lakeshore. If effective and cost efficient, the reproductive control program would be implemented in new areas where feasible. Direct reduction would be used in sections of the national lakeshore where immediate reduction is necessary due to unacceptable resource damage or public health and safety. Direct reduction would continue to be used to prevent unacceptable resource damage even in areas with fencing or reproductive control as necessary over the long term.

## **ALTERNATIVES CONSIDERED BUT REJECTED**

### **PREDATOR REINTRODUCTION**

This alternative is not feasible at Indiana Dunes National Lakeshore due to a lack of suitable habitat that is sizeable enough to support large predators. The national lakeshore is surrounded by developed areas; thus, the proximity to humans is not appropriate for reintroduction of predators that would prey on deer such as gray wolves or cougars. Other native animals as well as domestic pets could also become potential prey if predators were reintroduced to the Indiana Dunes National Lakeshore area.

### **POISON**

Under this alternative, poison mixed with food sources such as grains would be used to kill deer. Death from poisoning would not be immediate, and health concerns resulting from people potentially hunting and eating poisoned deer that have wandered out of the park could be an issue. In addition, non-target native wildlife or roaming pets could potentially eat a tainted carcass or the poison itself.

### **FENCING THE ENTIRE PARK**

The alternative of fencing the entire perimeter of the park is not feasible due to public accessibility and maintenance issues. In addition, for perimeter fencing to be effective, the

minimum fence height would need to be approximately 8 feet to prevent deer from jumping over the barrier.

## **CAPTURE AND TRANSFER**

Under this alternative, deer within Indiana Dunes National Lakeshore would be captured and relocated when population levels reached thresholds correlated to unacceptable levels of impacts.

Permits would be required from the Indiana Department of Natural Resources (DNR) for relocation of the animals into other portions of the state. The DNR Deer Biologist will not approve any permit to move deer in Indiana (Jim Mitchell, pers. comm. 2003). Deer could be relocated out of state, but special permits, testing, and possible quarantine processes would be required. Deer relocation methods have been shown to cost from \$400 - \$800 per deer (Porter 1991).

Live capture and relocation methods can result in high mortality rates among captured and/or relocated deer. Implementation of this alternative may result in the death of more than 50% of the deer during the first year after release (Jones and Witham 1990). In one study, only 15 percent of the relocated deer had survived one year after relocation (O'Bryan and McCullough 1985).

## **CAPTURE AND EUTHANIZE**

This alternative would involve live trapping and shooting of deer. A variety of trap methods or immobilization drugs could potentially be used. Trapped deer would be approached on foot and shot by individuals selected by the National Park Service. This method is considered to be less humane than hunting or sharp shooting due to stress levels of deer while detained in the trap or immobilized.

## **SUPPLEMENTAL FEEDING**

The management alternative of supplemental food sources for deer would potentially decrease browsing pressure on vegetation resources of the national lakeshore. However, increasing food sources would increase deer health and production, leading to growing populations of deer in the area. In the long-term, this would compound problems associated with high deer numbers (Maryland Department of Natural Resources n.d.).

## AFFECTED ENVIRONMENT

*Only the “issues” of relevance identified in chapter 1 need to track in chapter 3. Director’s Order #12 says that if information critical to decision-making is lacking, then the action should be modified to eliminate that portion of the action where impacts are uncertain. The affected environment section should state clearly what information is available, where conflicts exist in the data/interpretation, and what information is lacking. See DOH-12 2.8; and Director’s Order #12, 4.4 and 4.5 (unavailable information and use of technical and scientific analysis in decision-making).*

The following resources have been collected to date on Indiana Dunes National Lakeshore. These documents and other references, as well as other relevant documents, will be used to prepare the Affected Environment section of the environmental impact statement.

### ***Planning Documents***

NPS 1993 *General Management Plan Amendment – Development Concept Plan*

NPS 1997 *General Management Plan*

NPS 1997 *East Unit General Management Plan Amendment/FONSI*

NPS 1997 *Strategic Plan*

NPS 1993 *Statement for Management*

NPS 1991 *Biological Assessment for the GMP Amendment – West Unit Development Concept Plan*

### ***Legislation***

Indiana Dunes National Lakeshore Compilation of Legislation – overview of significant legislation regarding the national lakeshore

### ***Indiana Dunes National Lakeshore Resource Information***

*Ecosystem Study of the Indiana Dunes National Lakeshore, Vol. I*

- Chapter 1 – The Scope of Study and Framework for Analysis of the Ecosystem Study of the Indiana Dunes National Lakeshore.
- Chapter 2 – Historical Geography, Vegetation, and Land Use of the Indiana Dunes National Lakeshore.
- Chapter 4 – Geology and Soils of the Indiana Dunes National Lakeshore
- Chapter 5 – Climatology and Air Quality of the Indiana Dunes National Lakeshore

*Ecosystem Study of the Indiana Dunes National Lakeshore, Vol. II*

- Chapter 3 – The Biota of the Indiana Dunes National Lakeshore

Schweitzer 1992. The *Status of the Karner Blue Butterfly (Lycaeides melissa samuelis* Nabokov) at Indiana Dunes National Lakeshore, with special consideration of planning of prescribed burns at major sites.

NPS 1994 *Mammals of Indiana Dunes National Lakeshore*

Brock, et al. 1982 *A Habitat Study of Birds of the Indiana Dunes National Lakeshore*.

- Includes descriptions of species, management issues, and recommendations.

NPS 1990 *Special Vegetation of the Indiana Dunes National Lakeshore*

- Special vegetation elements/communities
- Survey methods and results

NPS 1980 *Report on the Special Vegetation of the Indiana Dunes National Lakeshore*

Bowles 1988 *A Report on Special Floristic Elements at the Indiana Dunes National Lakeshore: New Species Monitoring and Update of Selected Existing Populations*

NPS 1986 *Action Plan for Endangered and Threatened Plant Species within Indiana Dunes National Lakeshore*

Peloquin et al. n.d. *Ecology of Miller Woods – Indiana Dunes National Lakeshore*

- Chapter 1 – Terrestrial Vascular Plants
- Chapter 2 – Terrestrial Vertebrates
- Chapter 3 – Breeding Birds
- Chapter 4 – Terrestrial Insects
- Chapter 5 – Aquatic Biology
- Chapter 6 – Erosional Considerations

## ENVIRONMENTAL CONSEQUENCES

*Important changes have been made in the way NPS analyzes, describes and documents (formats) its NEPA analysis. It is a mandated process by Director's Order #12 (see 4.5 (g)).*

*Using the best available data, the context, duration and intensity of impacts. Including cumulative impact must be defined.*

*The park was briefed on what methods would be used for impact assessment, and how they will be involved in setting up the criteria for impact intensity. The Sourcebook has several examples (see tabs 22, 24, and 29).*

*Impact indicators must be set up for each impact topic.*

***Example of Intensity:****Impact to vegetation from deer management.*

*Negligible: Impacts would have no measurable or perceptible changes in plant community size, integrity, or continuity.*

*Minor: Impacts would be measurable or perceptible but would be localized within a relatively small area. The overall viability of the plant community would not be affected and, if left alone, would recover.*

*Moderate: Impacts would cause a change in the plant community (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized.*

*Major: Impacts to the plant community would be substantial, highly noticeable, and permanent.*

*Impairment: Deer populations would contribute substantially to the deterioration of vegetation to the extent that park plant communities would no longer function as a natural system. In addition, these adverse major impacts to park resources and values would:*

- contribute to deterioration of the rich biodiversity within the park to the extent that the park's purpose could not be fulfilled as established in its enabling legislation;*
- affect resources key to the park's natural or cultural integrity or opportunities for their enjoyment; or*
- affect the resource whose conservation is identified as a goal in the park's general management plan or other park planning documents.*

**Results of Discussion with Park:** Some preliminary discussion occurred with park staff on impact analysis, particularly related to impairment of park resources. Prior to the initiation of the draft environmental impact statement, methodologies and impact thresholds that are appropriate for measuring impacts to park resources will be presented and discussed with park staff.

## CONSULTATION AND COORDINATION

A Dunes Region Deer Study Committee was formed in February of 1999 to “develop recommendations for the Indiana Department of Natural Resources, other land holding agencies, and communities for managing deer along the Lake Michigan Shoreline.” Specific areas of concern included Indiana Dunes State Park, Indiana Dunes National Lakeshore, and the communities of Dune Acres and Beverly Shores. The committee included representatives from local communities, state agencies, counties, hunting groups, environmental groups, and Indiana Dunes National Lakeshore. The process consisted of nine meetings and two field trips. A final report was released in August of 1999 detailing management recommendations agreed upon by the committee.

A technical committee will be established to provide guidance and decision making regarding monitoring protocol and impact thresholds to determine when management action is necessary. The committee will be made up of park staff, natural resource experts, and various public agency personnel.

Consultation with agencies, such as the State Historic Preservation Office and the Indiana Department of Natural Resources will be undertaken as part of the planning process. In addition, consultation with federal agencies such as the U.S. Fish and Wildlife Service and U.S. Geological Survey, etc., will be undertaken. Invitations will be extended to the above agencies to participate in the technical committee.

Future public scoping efforts will potentially include public meetings or open houses, newsletters, workshops, and dissemination of information and gathering of comments through the internet. Some of the individuals and groups that are likely to be involved in public scoping activities include:

- Dunes Regional Deer Study Committee
- Environmental Groups
- Ogden Dunes
- Indiana Department of Natural Resources
  - Indiana State Parks
- Veterinarians
- Indiana Medical Association
- Bow Hunters’ organizations
- Audubon Society
- Beverly Shores (town and residents)
- Dune Acres (town and residents)
- Tribal Entities
- Other NPS units
- Save the Dunes Council
- Sierra Club
- FAWN (Friends of Air Water and Nature)
- Chicago Wilderness
- Michigan City (town and residents)
- U.S. Fish & Wildlife Service
- Ogden Dunes (town and residents)
- The Nature Conservancy
- National Parks and Conservation Association
- Shirley Heinze Environmental Fund

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## **APPENDIX A**

### **DUNES REGION DEER STUDY COMMITTEE FINAL REPORT**